United States Patent [19]

Garber et al.

[11] **Patent Number: 4,905,163**

[45] **Date of Patent: Feb. 27, 1990**

[54] **INTELLIGENT OPTICAL NAVIGATOR DYNAMIC INFORMATION PRESENTATION AND NAVIGATION SYSTEM**

[75] Inventors: **Sharon R. Garber**, Crystal; **Darryn J. Kozak**, New Brighton; **John M. Kruse**, Minneapolis, all of Minn.; **Mark K. Clare**, Fort Wayne, Ind.

[73] Assignee: **Minnesota Mining & Manufacturing Company**, St. Paul, Minn.

[21] Appl. No.: **252,917**

[22] Filed: **Oct. 3, 1988**

[51] **Int. Cl.**[4] **G06F 15/18**

[52] **U.S. Cl.** **364/513**; 364/300; 364/200; 364/274.4; 364/274.7; 364/275.6; 364/275.9; 364/275.7

[58] **Field of Search** 364/513, 300, 200, 900

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,736,308 4/1988 Heckel .
4,752,889 6/1988 Rappaport et al. 364/513

OTHER PUBLICATIONS

Date, C., An Introduction to Database Systems, Reading: Addison-Wesley, 1-8, 1982.
Roussopoulos, N., Faloutsos, F., and Sellis, T., An efficient pictorial database system for PSOL, IEEE Transactions on Software Engineering, vol. 14, 639-650, 1988.
Conklin, J., Hypertext: An introduction and survey, IEEE Computer, 17-41, Sep. 1987.
Sustik, J., Brooks, T., Retrieving Information with Interactive Videodiscs, Journal of the American Society for Information Science, 24, 424-432, 1983.
MacGuide, vol. 1, p. 179A, 1988.
Duda, R., and Hart, P. Pattern Classification and Scene Analysis, 1-9, New York, Wiley & Sons, 1973.
BYTE, p. 14, Aug., 1988.
Macuser, p. 261, May, 1988.
Bergeron, B., Greenes, R., HeartLab and EkgLab: Skill-Building Simultaneous in Cardiology, Demonstrations Digest, 11th Annual Symposium on Computer Applications in Medical Care, 29-30, 1987.
Myklebust, A., Mechanical computer-aided engineering, IEEE Computer Graphics and Applications, 25-25, Mar., 1988.
Gossard, D., Zuffante, R., and Sakurai, H., Representing Dimensions, Tolerances, and Features in MCAE Systems, IEEE Computer Graphics and Applications, 51-59, Mar. 1988.
Wenger, E., *Artificial Intelligence and Tutoring Systems*, Los Altos, Morgan Kaufman, 79-88, 1987.
MACSYMA (advertising brochure from Symbolics, Inc.).
Rich, E., *Artificial Intelligence*, New York: McGraw-Hill, 215-222, 1983.

(List continued on next page.)

Primary Examiner—Allen MacDonald
Attorney, Agent, or Firm—Merchant, Gould, Smith, Edell, Welter & Schmidt

[57] **ABSTRACT**

Disclosed is a computerized information presentation system for dynamically organizing information in order to present to a user previously unrecognized relationships among portions of the information. The system comprises information description storage for storing information comprising a plurality of concepts and for each concept knowledge of allowable attributes for the concept and one or more of attributes, attribute values, and relationships among attributes and attribute values. The system further comprises categorization knowledge storage for storing knowledge of criteria for placing the concepts into categories and context determination for determining a current context based on system state. Mapping knowledge storage is included for storing knowledge of mappings between a particular context and the presentation of information. The system also includes dynamic categorization for dynamically placing the concepts into categories for presentation using the categorization criteria, the current context and the knowledge of mappings and for displaying on a user screen selected concepts and categories.

313 Claims, 83 Drawing Sheets